

Notes on Umbelliferæ of E. United States. I.

JOHN M. COULTER AND J. N. ROSE.

(WITH PLATE I.)

Our species of Umbelliferæ have always been more or less perplexing, chiefly on account of the attempt to discriminate them without mature fruit. For this reason, it has seemed to us a helpful thing to take up certain Umbelliferæ and present characters that can be used with reasonable certainty. It is well known that the best characters are obtained from the mature fruit, hence it is safe to give as general advice that no attempt be made to determine species of Umbelliferæ in its absence. Of course there are certain forms that can be recognized without fruit, but the rule holds good. The fruit should be examined both as to its surface and transverse section, and these taken together furnish reliable characters. It hardly needs to be said that the fruit is made up of two carpels and that it is superficially marked by more or less prominent ribs. Five ribs is the normal number for each carpel, one being dorsal (the commissural side being ventral), two lateral (nearest the commissural side), and two intermediate. These ribs may be connected by reticulations or not, may be developed into prominent wings or corky ridges, or may be suppressed entirely. Secondary ribs may also be developed in the intervals between the five primary ribs. Thin transverse sections should be made as near the middle of the carpel as possible, and the varying number, position and size of the oil-ducts, the outline of the seed section, the nature of the pericarp, and the rib sections, will be found to furnish most satisfactory characters. In figure 2, *a* indicates the oil-ducts, *b* the seed section, *c* the pericarp, *d* the commissural face. Frequently groups of thick-walled or smaller cells occur, usually subtending the ribs and even indicating their position in the absence of surface appearance. These groups, which will probably be helpful in classification, may be called "strengthening cells" for convenience.

In the following series of notes all the species east of the 100th meridian will be illustrated, at least by the transverse section of the carpel.

1) **SANICULA L.**—Fruit globular, covered with hooked prickles: carpels without ribs, each with 5 oil-ducts (2 ventral and 3 dorsal) (figs. 1, 2 and 3).—One to three feet high,

with 3 to 7-parted leaves; radical long-petioled; cauline short-petioled or sessile; their divisions sharply cut and serrate. Involucre and involucels few-leaved. Flowers greenish or yellowish. May to August.

1. *S. Canadensis* L. Spec. 235. Leaf-divisions 3 to 5: sterile flowers comparatively few, short pedicelled: style shorter than prickles: oil-ducts mostly large, occupying nearly the whole thickness of the pericarp; seed-section deeply sinuous in outline (figs. 1 and 2).—Common throughout the region.

2. *S. Marylandica* L. Spec. 235. Leaf-divisions 5 to 7: sterile flowers numerous, longer pedicelled: style much longer than prickles: oil-ducts smaller, in thicker pericarp; seed-section nearly entire (fig. 3).—Common throughout the region.

OSMORHIZA Raf.—Fruit linear-oblong, long tapering at base, deeply grooved at commissure, bristly: carpels with 5 prominent primary ribs, each subtended by a well defined group of strengthening cells, section nearly pentagonal, no oil-ducts; seed-section more or less deeply concave on the inner face (figs. 4, 5 and 6).—One to three feet high, with aromatic roots. Leaves ternately compound; leaflets ovate, strongly toothed or cleft. Involucre and involucels few-leaved. Flowers white. May to June.

1. *O. longistylis* DC. Prodr. iv. 232. Slightly pubescent or smooth: styles slender, nearly as long as the ovary (not the fruit): seed-section deeply and broadly concave (figs. 4 and 5).—Throughout the northern states and westward.

2. *O. brevistylis* DC. Prodr. iv. 232. Villous pubescent: styles conical, very short: seed-section less deeply and more narrowly concave (fig. 6).—Throughout the northern states and southward to N. Carolina. It is a question whether the specific name *O. dulcis* Raf. may not have the prior claim. The western *O. nuda* Torr. has the seed-section still less concave and strengthening cells less developed and well represents a third member in the series as here arranged.

CONIOSELINUM Fisch.—Fruit oblong, flattened dorsally, smooth: carpels with 5 prominent primary ribs, the lateral ones extended into broad wings; oil-ducts 1 to 4 in the intervals, 4 to 8 on the commissural side; seed slightly concave on the inner face (figs. 7 and 8).—One to five feet high, sometimes smaller, smooth. Leaves 2 to 3-pinnately compound, with inflated petioles. Involucre and involucels few-

leaved, the former sometimes wanting, the latter awl-shaped. Flowers white. August to October.

1. *C. Canadense* Torr. & Gray, Fl. i. 619. Leaflets pinnatifid: lateral wings nearly as broad as the seed; oil-ducts 2 or 3 in the intervals, sometimes 1 or 4.—Swamps and cold cliffs from Vermont to Minnesota and northward, also southward along the high mountains to N. Carolina, and in Indiana.¹

The discovery of a quantity of fine fruiting specimens has enabled us to make a careful examination of fruit characters. Bentham & Hooker have referred this species to *Selinum*, which is characterized by single oil-ducts in the intervals, rarely 2. Their decision, however was based upon immature fruit, while our recently collected specimens show 2 and 3 to be the usual number of oil-ducts in the intervals, sometimes 1, and rarely 4. This fact would put the species in *Ligusticum* as defined by Bentham & Hooker. Its characters of broad lateral wings, inflated petioles, and pinnately compound leaves, however, make it so distinct from our own *Ligusticums* that it seems proper to retain the genus *Conioselinum* for this species. Possibly *Conioselinum Fischeri* is properly referred to *Selinum*. *C. Canadense*, if it could be included under *Selinum*, would belong to the broad lateral-winged section *Euselinum*, but with the oil-ducts of *Ligusticum* it must either stand as an intermediate genus between *Ligusticum* and *Selinum* or these two genera must be merged into one. But *Conioselinum* is more closely related to the *Angelica* group than to the *Selineæ*. In fact, its broad lateral wings and only somewhat prominent dorsal and intermediate ribs at once separate it from *Selineæ* and include it among *Angeliceæ* even to a superficial observer, a relationship which the minute structure of the fruit confirms. It is a question whether it should not be included with *Angelica* and *Archangelica* in a single genus. The only characters which serve to separate it from them are the much more dissected foliage (which does not count for much) and the absence of prominent bundles of strengthening cells beneath each rib, especially conspicuous under the lateral ribs. These characters can be made to separate *Conioselinum* from the other members of the *Angelica* group, but whether they should be considered generic or sub-generic is a matter of doubt. It seems best for the present to consider this genus as intermediate in its characters between *Selineæ* and *Angeliceæ*.

¹BOTANICAL GAZETTE, xi. 338.

ERIGENIA Nutt.—Fruit much flattened laterally, nearly round, notched at base and apex, thin between the incurved carpels, smooth: carpels very thin-walled, with 5 small primary ribs; oil-ducts one to several in the intervals, 9 to 11 on the commissural side, which is drawn out (neck-like in section) into the narrow commissure; seed-section deeply two-lobed on the inner side, longitudinal section semilunar (figs. 9 and 10).—Low, diffuse, glabrous, from a deep round tuber, in early spring. Leaves ternately decomposed, segments oblong. Involucels foliaceous. Flowers white.

1. *E. bulbosa* Nutt. Genera, i. 188. Span or so high: leaves radical except those subtending the imperfect umbels.—W. New York and Pennsylvania westward into the Mississippi valley.

CRYPTOTÆNIA DC.—Fruit linear-oblong, flattened laterally, somewhat grooved at the commissure, smooth: carpels with 5 small obtuse primary ribs; a single oil-duct beneath each rib and in each interval, 2 to 4 on the commissural side, which also contains two bundles of strengthening cells (in addition to those of the carpophore) besides those subtending each rib; seed-section roundish, slightly concave on the inner face (figs. 11 and 12).—One or two feet high, smooth. Leaves thin, 3-foliolate. Involucre none; involucels minute or none. Flowers white. June to September.

1. *C. Canadensis* DC. Mem. Umbel. 42. Leaflets large, ovate, 2 to 4 inches long, pointed, doubly serrate, lower ones lobed: fruit often becoming curved.—Canada to Minnesota and south to N. Carolina and Mississippi.—In this species the carpellary walls have two distinct layers, the outer being almost made up of the very broad bundles of strengthening cells, the inner composed of a single layer of large parenchyma cells set palisade fashion, and in which the oil-ducts always occur (fig. 13). This peculiar character, differing from any other umbellifer studied, serves to strengthen the position of *Cryptotænia* as a genus distinct from *Pimpinella*, to which Bentham and Hooker consider it too closely allied, as in *Pimpinella* there is no such inner layer and the bundles of strengthening cells are very small and widely separated.

EXPLANATION OF PLATE I.—Fig. 1. Fruit of *Sanicula Canadensis*. Fig. 2. Section of carpel of same: *a*, oil-ducts; *b*, seed section: *c*, pericarp; *d*, commissural face. Fig. 3. Section of carpel of *S. Marylandica*. Fig. 4. Fruit of *Osmorhiza longistylis*. Fig. 5. Section of carpel of same. Fig. 6. Section of carpel of *O. brevistylis*. Fig. 7. Fruit of *Conioselinum Cana-*

dense. Fig. 8. Section of carpel of same. Fig. 9. Fruit of *Erigenia bulbosa*. Fig. 10. Section of carpel of same. Fig. 11. Fruit of *Cryptotænia Canadensis*. Fig. 12. Section of carpel of same. Fig. 13. Section of carpel wall of same. Figs. 1 and 4 $\times 2\frac{1}{2}$; 7, 9 and 11 $\times 5$; transverse sections $\times 27$; 13 $\times 125$.

BRIEFER ARTICLES.

Death of Dr. Wigand.—By the death of Prof. Albert Wigand, of Marburg, Hesse, the scientific world has lost a strong and able friend. He died in Marburg, October 22d, after a severe illness, at the age of sixty-five years. For many years he has held the position of professor of botany and director of the botanical garden connected with the university of that place. Being the only professor of botany in the university, his work was naturally subdivided; as director of the garden and lecturer in the pharmaceutical institute and of general botany, he had not much remaining time to devote to any one branch of the science, as so many German professors have done. Hence his name is not so well known to American scientists. Many of them, however, know him as one of the last of the German botanists who may be said to belong to the old school. In fact, it was his lot to live during one of the transition periods of science, and he was among the few who refused to fall in with the general current. He suffered from this more or less by the isolation which such conservatism always brings, but in no way did this serve to diminish his ardor for his work, or his usefulness in leading others to an enthusiasm in the pursuit of truth in a degree which few teachers are able to reach. Among the evidences of the former are numerous works and papers which he found time out of his busy life as teacher, from time to time to publish. In respect to the latter statement it is perhaps enough to say that he reckoned among his students such men as Eichler of Berlin, and Pfeffer of Tübingen. Whatever may be said concerning his peculiar views on certain points, it is quite certain no teacher could have been more careful and conscientious in presenting them to his hearers, simply as his own views, in carefully distinguishing between mere theories and established facts. Certainly none who ever came within the radius of his influence can doubt the sincerity of his character, his devotion to truth and entire consecration to its interests.—EMILY L. GREGORY.

The Genus *Iris*.—It is well known to botanists that Professor Michael Foster, the distinguished physiologist of the University of Cambridge, has for several years paid particular attention to the genus *Iris*, has in cultivation all the species and varieties he has been able to obtain, and has carefully studied the principal forms from seedling states through their whole development and in critical cases from generation to generation. He may be supposed now quite thoroughly to understand the Old World